

REMARKS

This amendment is in response to the non-final Office Action (Paper No. 20070216) mailed on the 26th of February 2007.

Claims 15-17, 24-30, and 32-41 are canceled without disclaiming their subject matter.

Claims 1 and 11 are amended.

Reexamination and reconsideration are respectfully requested.

Status of Claims

Claims 1-7, 9-30, and 32-41 are pending.

Claim 1 is rejected under 35 U.S.C. §102(b) as being anticipated by Chuang *et al.* (US 6,062,931).

Claims 1, 5-6, 9-10, 15, 24-29, 32-33, and 38-41 are rejected under 35 U.S.C. §102(b) as being anticipated by Uemura *et al.* (US 6,239,547).

Claims 1-2, 4, and 24-27 are rejected under 35 U.S.C. §102(b) as being anticipated by Nakada *et al.* (US 6,455,989).

Claim 3 is rejected under 35 U.S.C. §103(a) as being unpatentable over Nakada *et al.* (US 6,455,989) in view of Choi *et al.* (US 2001/0006232).

Claims 7 and 30 are rejected under 35 U.S.C. §103(a) as being unpatentable over Uemura *et al.* (US 6,239,547) in view of Ito (US 6,885,142).

Claims 14 and 37 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nakada *et al.* (US 6,455,989) in view of Lee *et al.* (US 2002/0175617).

Claim 34 is rejected under 35 U.S.C. §103(a) as being unpatentable over Uemura *et al.* (US

6,239,547) in view of Cole *et al.* (US 6,919,730).

Claims 11 and 16 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nakada *et al.* (US 6,455,989) in view of Cole *et al.* (US 6,919,730).

Claims 12 and 35 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nakada *et al.* (US 6,455,989) in view of Cole *et al.* (US 6,919,730) with further consideration to Mau *et al.* (US 6,866,801).

Claims 13, 17, and 36 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nakada *et al.* (US 6,455,989) in view of Lee *et al.* (US 2002/0175618).

Regarding claim 1

Claim 1 is rejected under 35 U.S.C. §102(b) as being anticipated by Chuang *et al.* (US 6,062,931). Claim 1 is also rejected under 35 U.S.C. §102(b) as being anticipated by Uemura *et al.* (US 6,239,547). Claim 1 is also rejected under 35 U.S.C. §102(b) as being anticipated by Nakada *et al.* (US 6,455,989).

Claim 1 is amended to clearly present the features of the present invention, as shown in Applicant's FIGS. 3, 4, 9 and 11. Applicant also traverses the Examiner's rejection by Nakada *et al.* '989 and Uemura *et al.* '547.

Regarding the rejection by Nakada *et al.* '989

Applicant submits that the Examiner **has not provided** reasoning for the feature of "said base layer having an outer surface that includes prominences and depressions," as set forth in Applicant's claim 1. The Examiner interpreted element 16a of Nakada *et al.* '989 as the carbon nanotube layer

of Applicant's claim 1, and element 161 of Nakada *et al.* '989 as the base layer of Applicant's claim 1. Nakada *et al.* '989, however, does not teach that projecting structure 161 has prominences and the depressions as set forth in Applicant's claim 1. If the Examiner believes that Nakada *et al.* '989 teaches the prominences and the depressions, the Examiner is respectfully requested to provide reasoning that supports the Examiner's rejection. Therefore, there is no anticipation by Nakada *et al.* '989.

Regarding the rejection by Chuang *et al.* '931

The Examiner states that FIG. 6 of Chuang *et al.* '931 shows prominences and depressions. FIG. 6 of Chuang *et al.* '931, however, shows carbon nanotubes 32 grown on only prominences. Chuang *et al.* '931 teaches that "the array of carbon nanotubes, such as 32, is formed through growth vertically upwards from the island areas" (col. 4, lines 30-31). Chuang *et al.* '931 actually teaches that the element 61 is a discontinuous layer, and can be made by etching catalyst material 51 (col. 4, line 28). Therefore, Chuang *et al.* '931 clearly teaches and shows that carbon nanotubes are grown only on the prominences. Claim 1 is amended to present that carbon nanotubes are grown on both of prominences and depressions as shown in Applicant's FIGS. 3, 4, 9, and 11.

Regarding the rejection by Uemura *et al.* '547

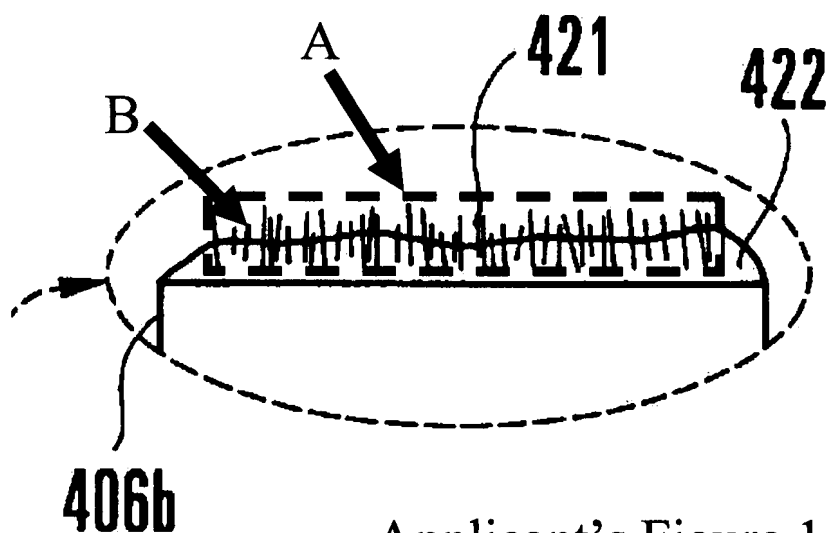
In support of the rejection, the Examiner interpreted element 421 of Uemura *et al.* '547 as a carbon nanotube layer of Applicant's claim 1, and element 422 as a base layer of Applicant's claim 1. And then, the Examiner asserts that FIG. 4 of Uemura *et al.* '547 teaches the carbon nanotube layer being provided on the base layer in a state substantially un-mixed with the base layer.

Applicant's claim 1 recites "a carbon nanotube layer" and "a plurality of carbon nano tubes" included in the carbon nano tube layer. In the reasoning supporting the rejection, the Examiner states (page 4, lines 10-11 of the present Office Action):

"with the electron emission sources including a **carbon nanotube layer (421)** and a base layer (conductive adhesive 422)."

The Examiner also states (page 4, lines 15-16 of the present Office Action):

"the carbon nanotube layer comprising a plurality of **carbon nanotubes (graphite columns 421)**."



Applicant's Figure 1

Therefore, under the Examiner's reasoning, **a carbon nanotube** is the same as **a carbon nanotube layer**. Applicant claim 1, however, does not recite that a carbon nanotube comprising a plurality of carbon nanotubes, but recites that **a carbon nanotube layer comprising a plurality of carbon nanotubes**. In other words, a carbon nanotube layer of Applicant's claim 1 includes two or more than two carbon nanotubes. Applicant presents a figure (Applicant Figure 1), which is an insert of FIG. 4 of Uemura *et al.* '547, to clearly understand the Examiner's interpretation. Applicant made marks A and B, and dotted lines enclosing a group of elements 421. Mark "A" represents the group of elements 421 enclosed by the dotted lines, and mark "B" represents a single element 421.

The Examiner is respectfully requested to clearly point out which one ("A" or "B") the Examiner interprets as "a carbon nanotube layer" of Applicant claim 1. The Examiner is also respectfully requested to point out which element the Examiner interprets as "a plurality of carbon nanotubes" of Applicant's claim 1.

Because in order to be rejected under 35 U.S.C. §102(b), "[t]he identical invention must be shown in as complete detail as is contained in the ... claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989), Applicant believes that the Examiner is able to answer the Applicant's request.

In the Response to Argument of the present Office Action, the Examiner argues (page 16 of the present Office Action):

"the degree at which the CNT is unmixed is determined by the fact that a distinction between the two different layers is made (1) a graphite column layer (distinguished as 421) and (2) a base layer

(distinguished as 422) used as a binder. Hence, the CNTs are inherently substantially unmixed.”

Applicant’s claim 1 **does not** recite that carbon nanotubes are substantially un-mixed with the base layer, but recites that the **carbon nanotube layer** is substantially un-mixed with the base layer. The truth of the Examiner’s argument depends on the Examiner’s interpretation of “a carbon nanotube layer” and “a plurality of carbon nanotubes.” Therefore, the Examiner is again respectfully requested to clearly answer which element (“A” or “B”) the Examiner interprets as a carbon nanotube layer.

Reexamination and reconsideration of the amended claim 1 is respectfully requested.

Regarding claim 11

Claim 11 is rejected under 35 U.S.C. §103(a) as being unpatentable over Nakada *et al.* (US 6,455,989) in view of Cole *et al.* (US 6,919,730). Claim 11 is amended to present features shown in Applicant’s FIG. 11. Applicant also would like to point out errors in the Examiner’s reasoning that is provided for the rejection of the previously presented claim 11.

First, Nakada *et al.* ‘989 does not teach the feature of “said base layer having an outer surface that includes prominences and depressions,” as set forth in Applicant’s claim 1. Therefore, previously presented claim 11 is not obvious.

Second, Applicant’s claim 11 reads “**thin film** having prominences and depressions.” The dimension recited in claim 11 is not a dimension of the prominences and depressions of the base

layer, but dimension of prominences and depressions of the **thin film**. The Examiner has not provided reasoning about which element the Examiner interprets as the thin film of Applicant's claim 11.

Third, the Examiner asserts that Cole *et al.* '730 teaches the dimension of prominences and the depressions as set forth in claim 11, but it is not clear which dimension Cole *et al.* '730 actually teaches. Applicant's claim 11 recites that "prominences and depressions at 0.05 to 10 μ m width, 0.01 to 5 μ m depth and 1 to 20 μ m intervals." Applicant's specifically recites a width, a depth, and an interval. Cole *et al.* '730 teaches that "the platforms are 1-5 micron **rectangles**, with a 1-5 micron spacing" (col. 3, 24-25). It appears that the Examiner interprets the rectangle as a width times depth, but nowhere does Cole *et al.* '730 teach that the rectangle means a width times depth. Applicant would like to ask why the rectangle should not be interpreted as a width times length. Even after carefully reading Cole *et al.* '730, Applicant is not able find out the definition or meaning of the rectangle.

FIG. 3 of Cole *et al.* '730 shows overlapping portions 375 and 380 on which carbon nanotubes 385 are grown. Each of the platforms of portions 375 and 380, on which carbon nanotubes are grown, has a rectangular shape. Through FIGS. 2 and 3, the definition and meaning of a rectangle of Cole *et al.* '730 is not clear.

The American Heritage Dictionary of the English Language defines "platform" as a horizontal surface raised above the level of the adjacent area, as a stage for public speaking or a landing alongside railroad tracks. Without clear definition of a rectangle in the specification of Cole *et al.* '730, the rectangle of Cole *et al.* '730 could be the shape of a horizontal surface or could be

the shape of a side surface of the platform.

The Examiner is respectfully requested to provide a solid evidence that indicates that the rectangle of *Cole et al.* '730 should be interpreted as a width times depth.

Reexamination and reconsideration of the amended claim 11 is respectfully requested.

Rejection of claim 12 under 35 U.S.C. §103(a)

Claim 12 is rejected under 35 U.S.C. §103(a) as being unpatentable over Nakada *et al.* (US 6,455,989) in view of Cole *et al.* (US 6,919,730) with further consideration to Mau *et al.* (US 6,866,801). Applicant traverses the Examiner's rejection for the following reasons.

In support of the rejection, the Examiner wrote that:

“Mau teaches that the prominences and depressions are formed of indium tin oxide (col. 2, line 65- col. 3, line 8).”

Applicant's claim 12 does not recite that the base layer is formed of indium tin oxide, but recites that “the thin film is formed of indium tin oxide.” Mau *et al.* '801 teaches that “the substrate may include a coating of material . . .” (col. 2, line 65- col. 3, line 8). The coating does not mean that the coating is prominences and depressions of the thin film of Applicant's claim 12. There is no suggestion that the prominences and depression of the thin film should be made of indium tin oxide.

The Examiner has ignored the presence of the thin film of claim 11, from which claim 12 depends. None of the cited references teaches the thin film. Therefore, there is no obviousness. Withdrawal of the rejection is respectfully requested.

Rejection of claim 13 under 35 U.S.C. §103(a)

Claim 13 is rejected under 35 U.S.C. §103(a) as being unpatentable over Nakada *et al.* (US 6,455,989) in view of Lee *et al.* (US 2002/0175618). Applicant traverses the Examiner's rejection for the following reasons.

In support of the rejection, the Examiner wrote that:

“Lee teaches a carbon nanotube density of the carbon nanotube layer being greater than the carbon nanotube density of the base layer (page 3, paragraph 18).”

Applicant's claim 13 presents that the density of carbon nanotubes of the carbon nanotube layer is much higher than the density of the carbon nanotubes of the base layer, which means there would be a few carbon nanotubes that penetrates into the base layer out of the carbon nanotube layer. The number of carbon nanotubes that could penetrate into the base layer is specifically represented by 100 to 1,000,000 times less than the carbon nanotubes of the carbon nanotube layer.

Lee *et al.* '618 teaches that higher density formed on the **edge** of carbon nanotube layer 52 (9th line of paragraph 18). Under the Examiner's reasoning, Lee *et al.* '618 should teach that there is a number of carbon nanotubes that penetrates into electrode layer 50 of Lee *et al.* '618. Nowhere does Lee *et al.* '618 teach that carbon nanotubes penetrates into the electrode layer. Therefore, there is no obviousness. Withdrawal of the rejection is respectfully requested.

Conclusion

In view of the above debate, the foregoing amendment, and remarks, all claims are deemed allowable and this application is believed to be in condition to be passed to issue. If there is any

question, the Examiner is asked to contact the Applicant's attorney.

No fee is incurred by this amendment.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Robert E. Bushnell', is written over a horizontal line.

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